REMARKS

A proposed change to the Title is set forth herein. Claims 3 and 5 have been amended to address typographical errors. New Claims 6-17 are presented.

The present invention enables a greater number of radio signals to be broadcast in a given geographic area. Improvements that allow a more efficient use of radio spectrum are highly desired especially in areas where wireless communication is pervasive. With increasing demand for radio spectrum bandwidth, there is urgency for communication engineers to develop innovative ways to conserve bandwidth and increase the efficiency with which data can be transmitted. Engineers must be concerned in their designs with data transmission efficiency but they also must be concerned with any radiated power since this may cause radio frequency interference with other transmitters and receivers in the area. Applicant's invention mitigates some of these concerns by freeing up precious bandwidth and reducing interference with other base stations to thereby allow more mobile users to operate within a geographic area.

A feature of the present invention conserves bandwidth by controlling the transmission level of a base station in accordance with a desirable protocol. When coupled with time division multiple access (TDMA) and space division multiple access (SDMA) technologies, an adaptive power transmitter creates yet another degree of freedom to manage spectrum. For example, when mobile users are close to the applicant's base station, the radio signal received at the base station will be robust. The base station will not need to use a large amount of transmission power to effectively communicate with these mobile radios since they are within the area of the base station.

The base station can then efficiently allocate these low power transmissions to certain time slices so the radio can broadcast with reduced power at those times.

Furthermore, coupled with adaptive beam technology the controller can also allocate power based on angular position relative to a base station. In this way the base station will transmit with only the energy necessary to effectively communicate with the radio, thereby reducing the probability of interfering with mobile users communicating with other base stations.

Thus, this active management of radiated power level opens up radio bandwidth in areas where the transmitted power is attenuated allowing other base stations to exploit this freed up bandwidth.

The Office Action rejected claims 1 to 5 as being obvious over the Sanders U.S. Patent No. 5,909,649 in view of the Katz U.S. Patent No. 6,321,082.

The Saunders disclosure, discloses a way to manage adaptive beams in SDMA technology with a set of distance metrics and an allocation of communication channels in accordance with distance. It acts on an angular proximity of adaptable beams of an adaptable array antenna. Saunders uses a Weiner or other digital filter to determine when two antenna beams are too close in angular position for the digital processors to resolve. Proximity in this sense is a mathematically concept related to the angular relationship of mobile radios to an adaptive antenna array. If two radios are close in elevation and azimuth even though they may be separated by large geographic distances, the Saunders filter will likely find them to be mathematically close.

The Saunders disclosure does not disclose some of the key features of applicant's invention. First, applicant's invention teaches a management of time slots assignments.

The Saunders reference addresses adaptive array antenna beams which broadcast to different receivers at the same time. Second, applicant's invention monitors received power levels and adjusts broadcast output power based on the received power level. The Saunders reference does not even mention the word "power" in it's disclosure. Third, the applicant's invention combines its teachings about time slot assignment with its power monitoring and control functions. Saunders does not disclose time slot management or power monitoring.

In the other cited disclosure, the Katz reference describes a technique for reducing certain problems with a multipath in a SDMA network such as the difference in frequencies between uplinks and downlink signals. The Katz disclosure attempts to distribute radiated power along different signal paths to the same radio. Katz proposes using an impulse response of a radio to determine path directions of the received signals from a single radio. According to the disclosure, signals can then be sent along a plurality of path directions to communicate with the mobile radio.

Katz also does not address the distinguishing features of the applicant's invention. First, applicant's disclosure teaches a management of time slot assignments while Katz deals with communication from a base station to a single radio during a single time slot. Second, applicant teaches a use of received power to determine the power radiated during a time slot. The Katz apparatus does not monitor power rather it uses an impulse response to determine the directions in which to radiate power. Third, the applicant's invention teaches a network management feature by assigning mobile radios to time slots. The Katz disclosure relates to a single radio assigned to a single time slot.

> Our reviewing courts have often advised the Patent and Trademark Office that it can satisfy the burden of establishing a *prima facie* case of obviousness only by showing some objective teaching in either the prior art, or knowledge generally available to one of ordinary skill in the art, that "would lead" that individual "to combine the relevant teachings of the references." *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989). Accordingly, an examiner cannot establish obviousness by locating references which describe various aspects of a patent application's invention without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done.
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> Ex Parte, Levengood, 28 U.S.P.Q. 1300, 1302 (Fed. Cir. 1993).

There are a number of elements in current claims that are not present in either the Katz or Sanders disclosures.

First, applicant has storage elements that contain assignments of time slots to mobile radios. The Office Action cites Saunders which has a table of distance metrics. The distance metrics in Saunders relate to the relative angular position of mobile radios and are largely independent of any time slot.

Second, the applicant measures a "reception level of a signal" that is not present in either Katz or Saunders. The Office Action on page 3 cites Saunders as follows:

> A plurality of antenna elements to receive signals where the signals are combined with a complex set of weights chosen for a communication device in a plurality of combiners (201).

However, the Saunders disclosure never mentions measuring the reception level of the signals. In it's description of the base station operation (Column 3, Lines 28 – 55), Saunders fails to mention measuring received signal power, reception level of the signals, or any other active signal measurement. The complex set of weights mentioned is for

directional beam-forming and is based on the angular position of a mobile device relative to the antenna array.

Third, the applicant compares the reception level to a threshold value. The Office Action again cites Saunders on page 3 as follows:

> A processor (209) for comparing the distance metric to a threshold value.

Our invention is comparing a reception level of a signal with a threshold value to determine how to manage time slots and control broadcast power. The reception level is a function of many variables including but not limited to: mobile radio power, antenna gain, atmospheric conditions, space loss and multipath. In contrast, Saunders "distance metric" is a mathematical measurement that is used to quantify the ability of a processor to resolve two separate signals received at an antenna array. The Saunders distance has little if anything to do with power or even physical distance.

> The distance calculated does not indicate the physical distance separating two communication devices rather, it indicates the ability of the base station to separate electrically the first communication device from a second communication device. (Saunders: Paragraph 4 Lines 43-47)

Fourth, the applicant has a "changing means" in claim 1 that allows the base station to change a time slot assignment of radios in the network. Saunders does not disclose changing **times slots** based on comparing a **reception level** with a threshold value, but rather would direct a person of skill in the art to change **communication channels** based on a **distance metric**.

The Katz invention does not disclose a "changing means" element since the disclosure relates to a predetermined network where time slots and frequency bands are fixed.

> Each data burst is transmitted in a given frequency band in a predetermined time slot in that frequency band. (Katz: Paragraph 5, Lines 14, 16).

Finally, the Office Action acknowledged that Saunders does not teach a control means during a time slot. The Office Action suggested that the Katz reference discloses that it would have been obvious to apply Katz to the present invention as follows:

> Preferably, if the distance between the first and second stations is less than the predetermined value, communication data is transmitted to the second station at a relatively low power. (Katz: Column 3, Lines 32-35)

However, it should be noted that applicant does not use distance as a criteria for adjusting power. The applicant's invention adjusts broadcast power based on the reception level of a signal from a mobile station that is "measuring a reception level of a signal received for each mobile station". Although distance can affect a reception level of a signal, it is also affected by multipath, atmospheric conditions, noise, broadcast power of the mobile station, antenna gain of the mobile station, antenna orientation of the mobile station, as well as other signals and noise on the frequency band. Only from the benefit of hindsight from the present invention is it possible to contend a correlation between received power and distance between two radios; however, the Katz disclosure does not motivate a person to use a reception level of a signal to regulate broadcast power.

As stated in Ex parte Chicago Rawhide Manufacturing Co., 223 USPQ 351 (PTO Bd. App. 1984):

> The mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for the worker in the art, without the benefit of the appellant's specification, to make the necessary changes in the reference device. *(underline added)*

A communication system that controls broadcast power by monitoring received signal strength can be considered superior to a system that adjusts power based on distance in at least two respects. First, determining the distance to a mobile radio requires some kind of distance measuring system that is not needed in the applicant's invention. Second, other factors contribute to signal attenuation and distortion and require the use of high transmission power despite a short distance between a base station and a mobile radio. For instance, if a mobile user is in a building close to the base station, a device using distance as a determinant would suggest that a low power transmission should be used, whereas the applicant's invention would sense the low reception level and use the full power transmission needed to reach the mobile radio.

The cited references do not provide a teaching of applicant's invention since the Katz disclosure does not adjust power based on the received signal strength. Instead, Katz uses low power during transmissions to a single radio near the base station to achieve a wide angular spread.

> If on the other hand the distance between the first and second stations is less than a predetermined distance, then the communication data is transmitted in from the first to the second station in a multiplicity of beam directions in order to achieve a wide angular spread. (Katz: Column 3, Lines 42-46)

Although, Katz does refer to the fact that reducing power decreases the risk of co-channel interference, it would not be obvious to broadcast with low power pursuant to

applicant's protocol. The Katz disclosure merely suggests distance between stations as the factor, although the Katz disclosure does not explain how to determine such a distance. Here, the applicant teaches the use of received signal power to determine the transmission power needed to transmit to the radio.

A mobile radio in a building near the base station, for example, can highlight an advantage of the present invention. In the example, the applicant's invention would receive a weak signal from a mobile radio, but could still broadcast to the radio successfully using full power. The Katz disclosure would suggest that a transmitter broadcast to the radio with low power reducing the probability of co-channel interference. Although this may decrease the probability of co-channel interference, it would also make it unlikely that the mobile radio would receive the transmission.

The new claims 6 though 17 define these advantages in their claim language.

It is believed the present case in now allowable. If there are any concerns with regard to this prosecution, or if the Examiner believes that a telephone interview will help further prosecution of the case, he is respectfully requested to contact the undersigned attorney at the listed phone number.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on October 11, 2005.

By: SHARON FARNUS

Signature

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Very truly yours,

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